

Correction of the Effect of Calima

- Saharan Air Layer (SAL)
- Shower Developement in the Atmosphere
- Measurements of Atmospheric Absorption
- Method to correct for SAL
- Results

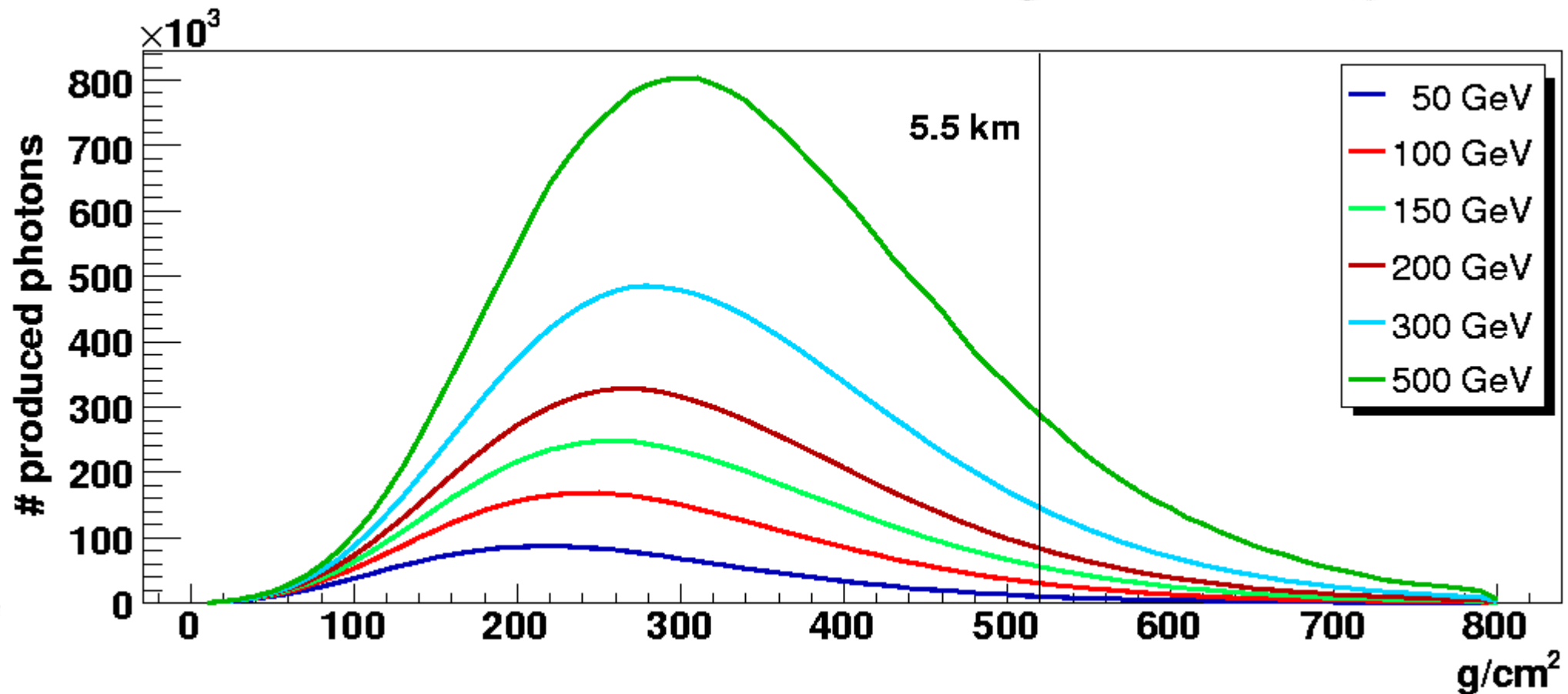
The Saharan Air Layer (SAL)

- warm, dry air from the Sahara, moving westward, undercut by cool air from the sea
- elevated layer of sand-dust (air from the Sahara and mineral dust)
- occurring in the North Atlantic between the Sahara, the US and the western Caribbean Islands
- between 1.5 km and 5.5 km a.s.l.

Ref.: Dunion et al., 2004, Bull. Amer. Meteor. Soc.

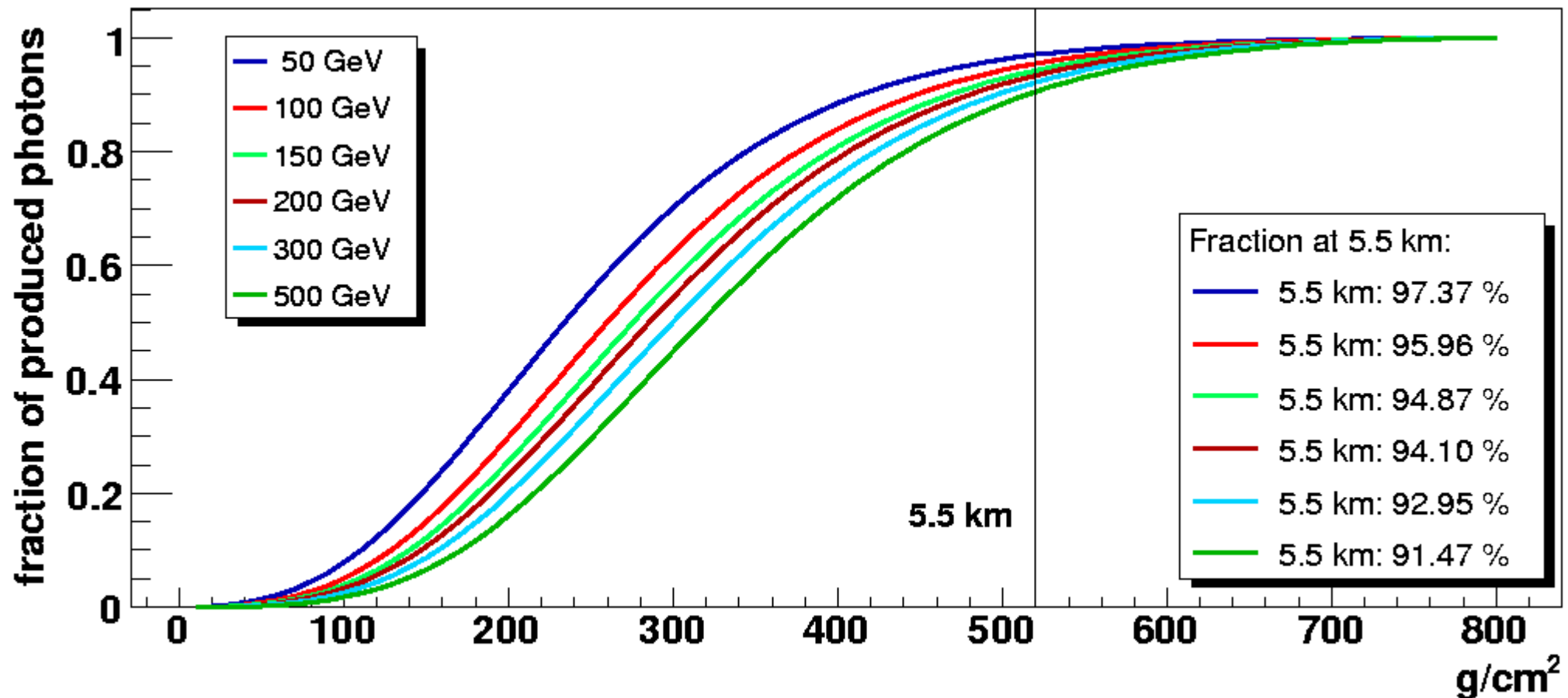
=> absorption of light => smaller size => underest. energy

Shower development Produced Photons



Shower developement

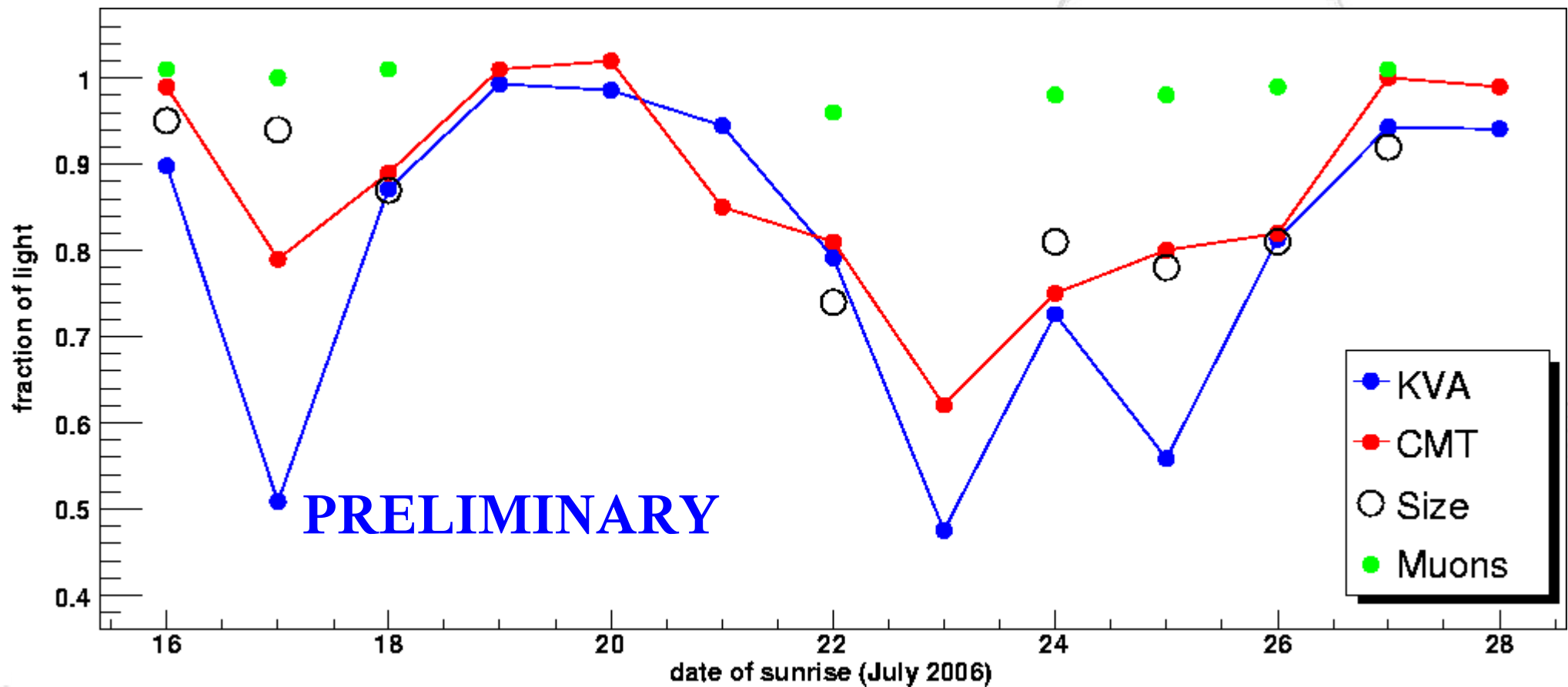
Fraction of produced light



Measurements of the atmospheric absorption

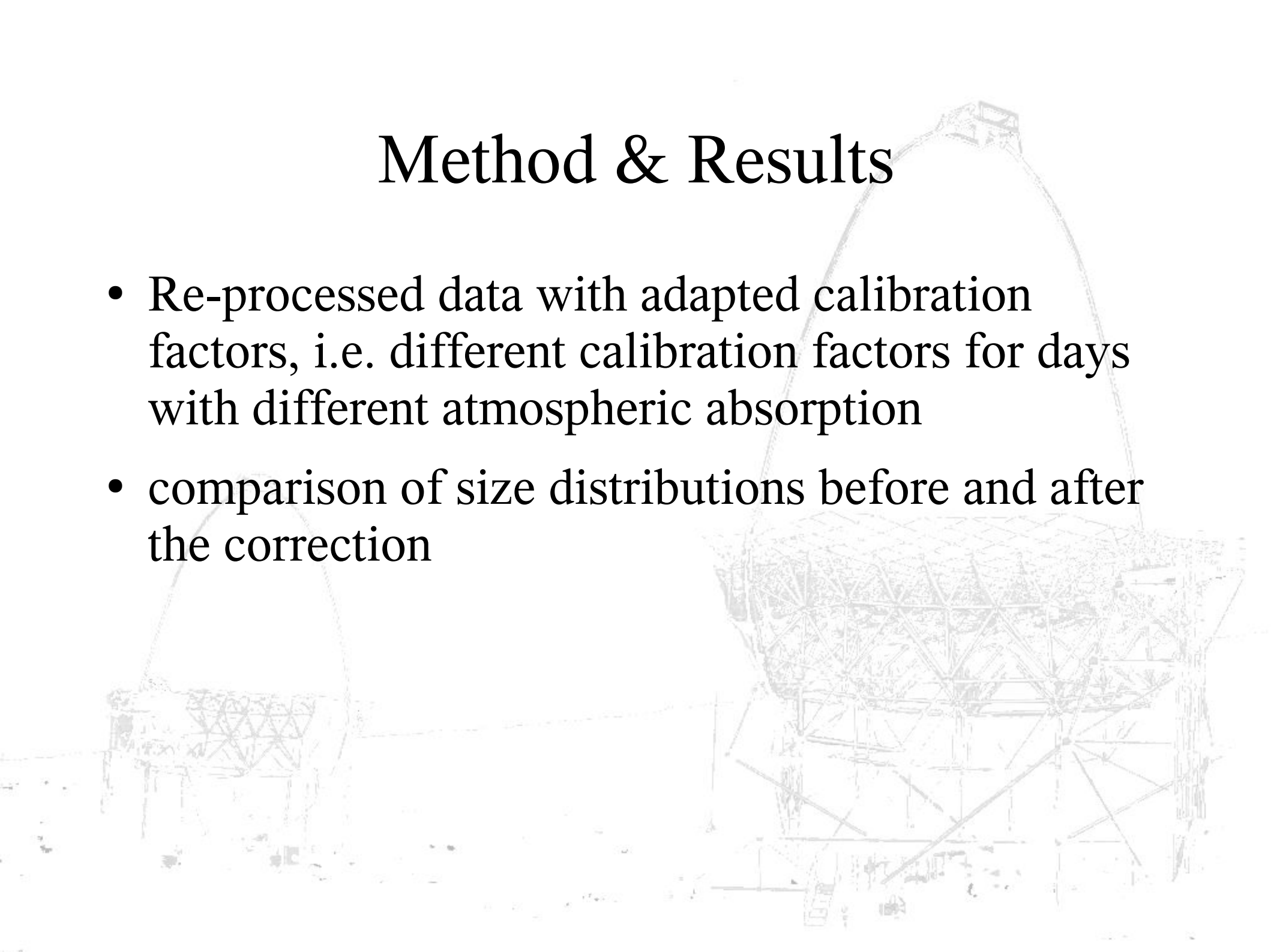
- Carlsberg Meridian Telescope (CMT): value for atmospheric extinction in the r-band (625 nm) for each night
(can be used, as SAL is mainly Mie-scattering)
- KVA: measurement of the atmospheric absorption from the optical data
- MAGIC: comparison of size distributions of affected data to good data
- muons: suffer only part of the absorption

Measurements

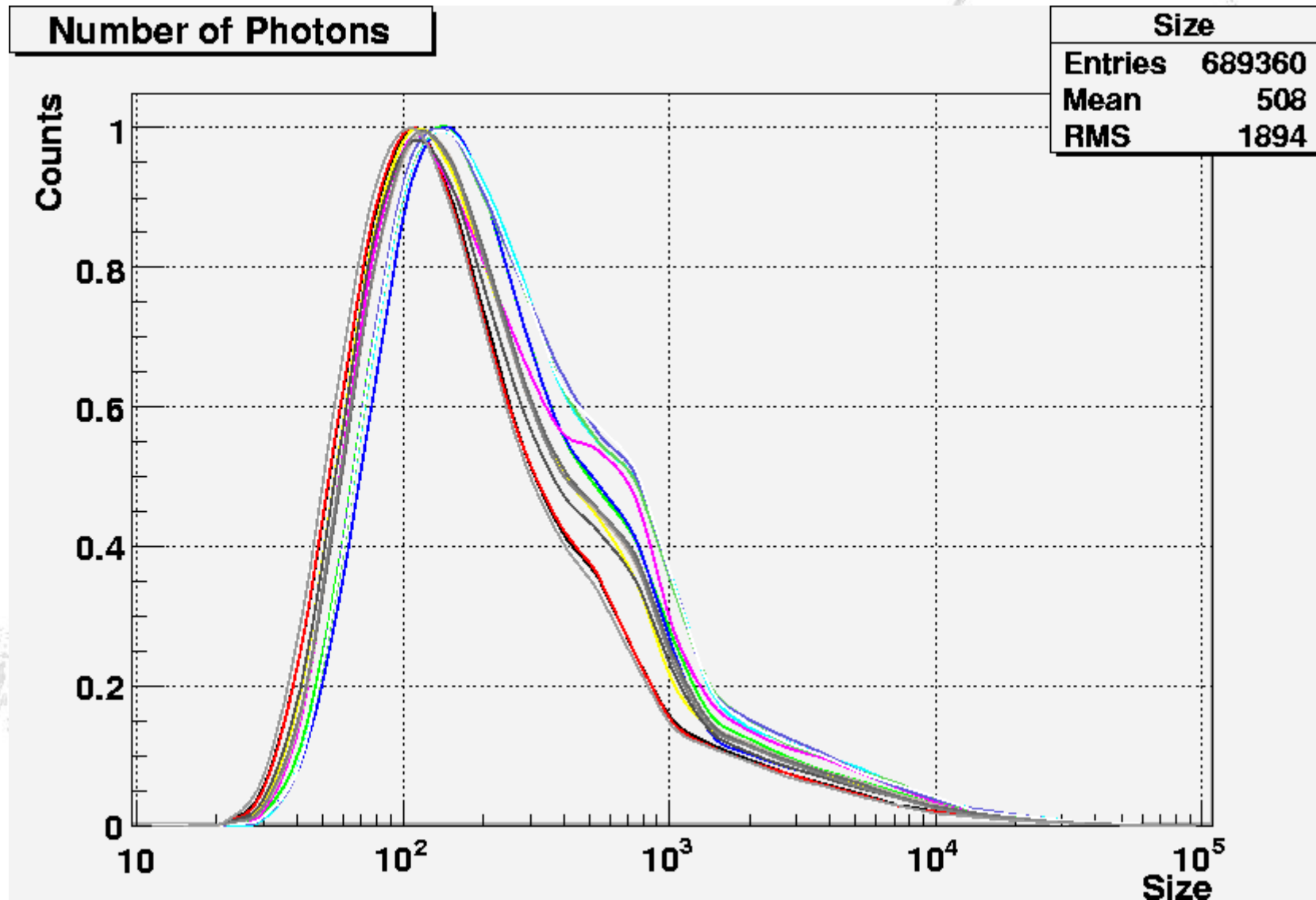


Method & Results

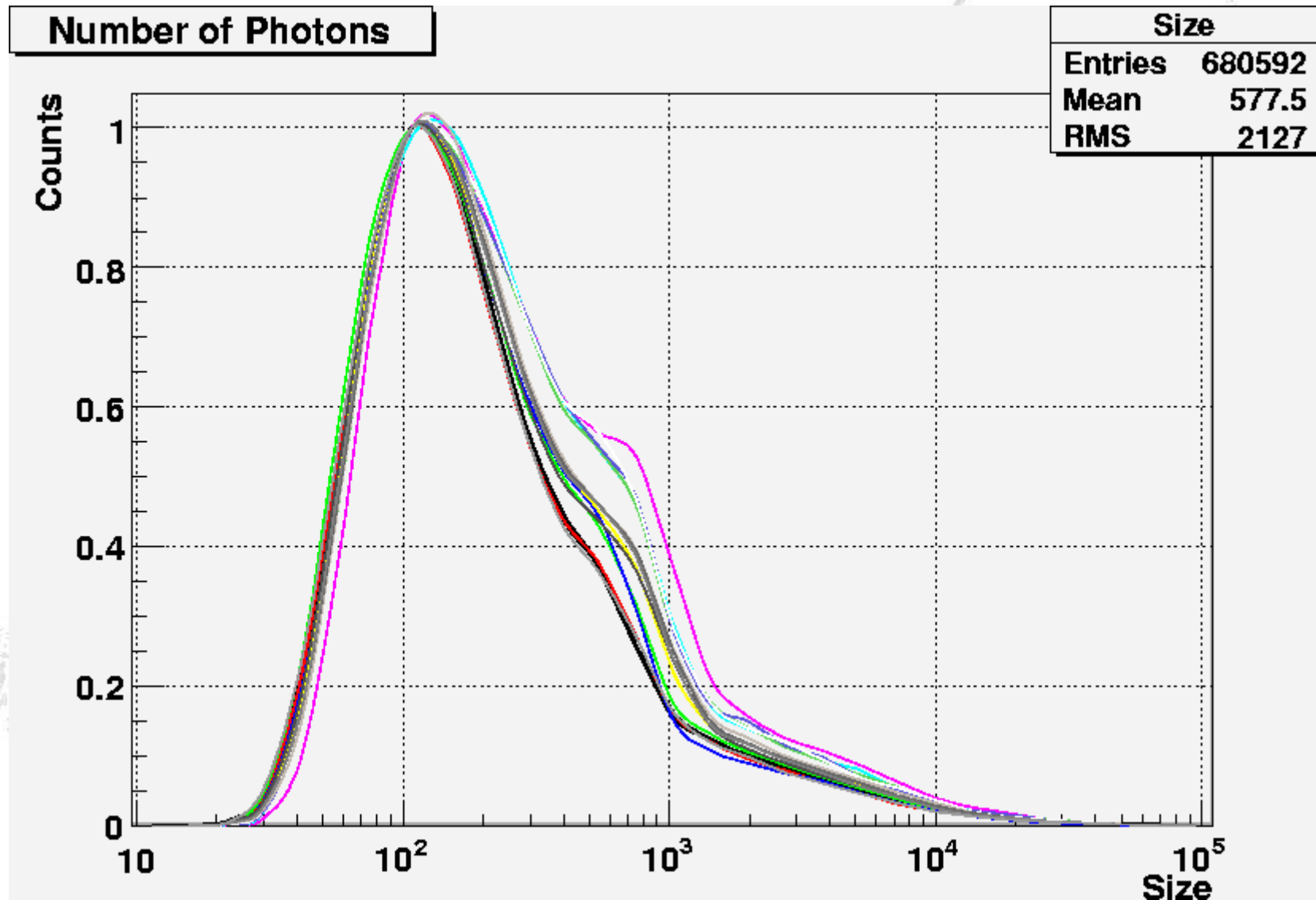
- Re-processed data with adapted calibration factors, i.e. different calibration factors for days with different atmospheric absorption
- comparison of size distributions before and after the correction



Size Distributions before Correction



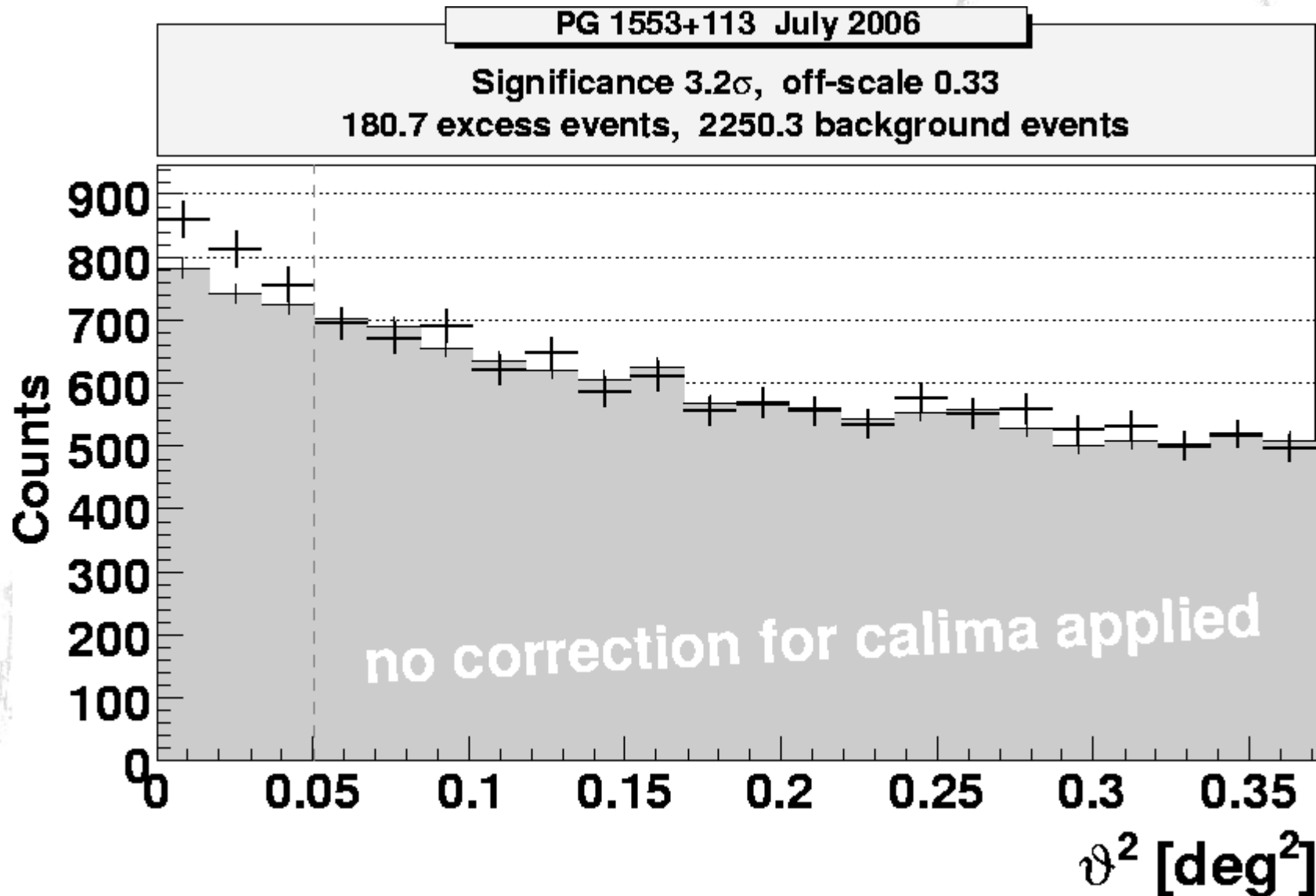
Size Distributions after Correction



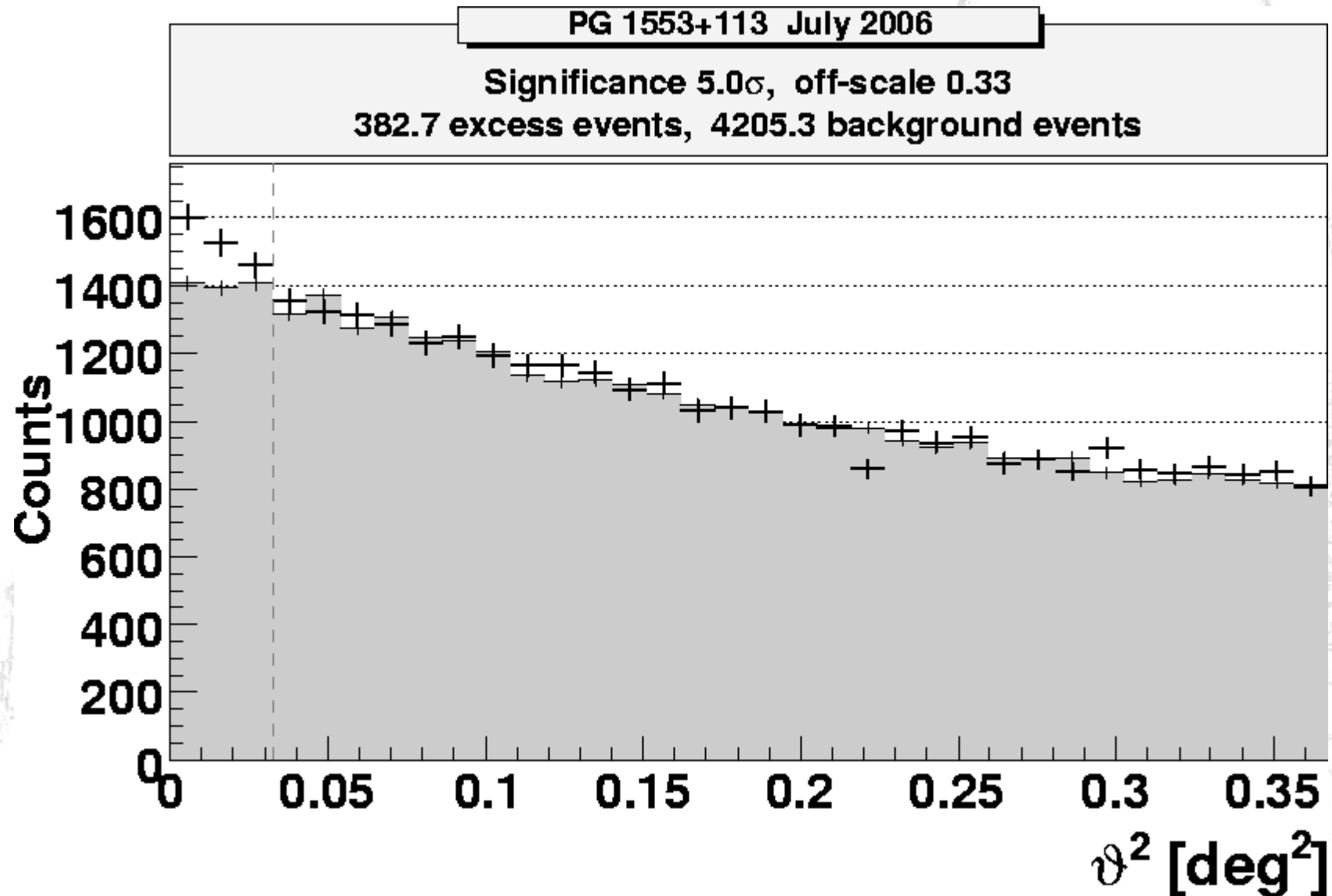
Method & Results

- Re-processed data with adapted calibration factors, i.e. different calibration factors for days with different atmospheric absorption
- comparison of size distributions before and after the correction
- applied method to data of PG 1553+113 taken during a MWL Campaign in July 2006
- comparison of results with and without correction (same area cut)

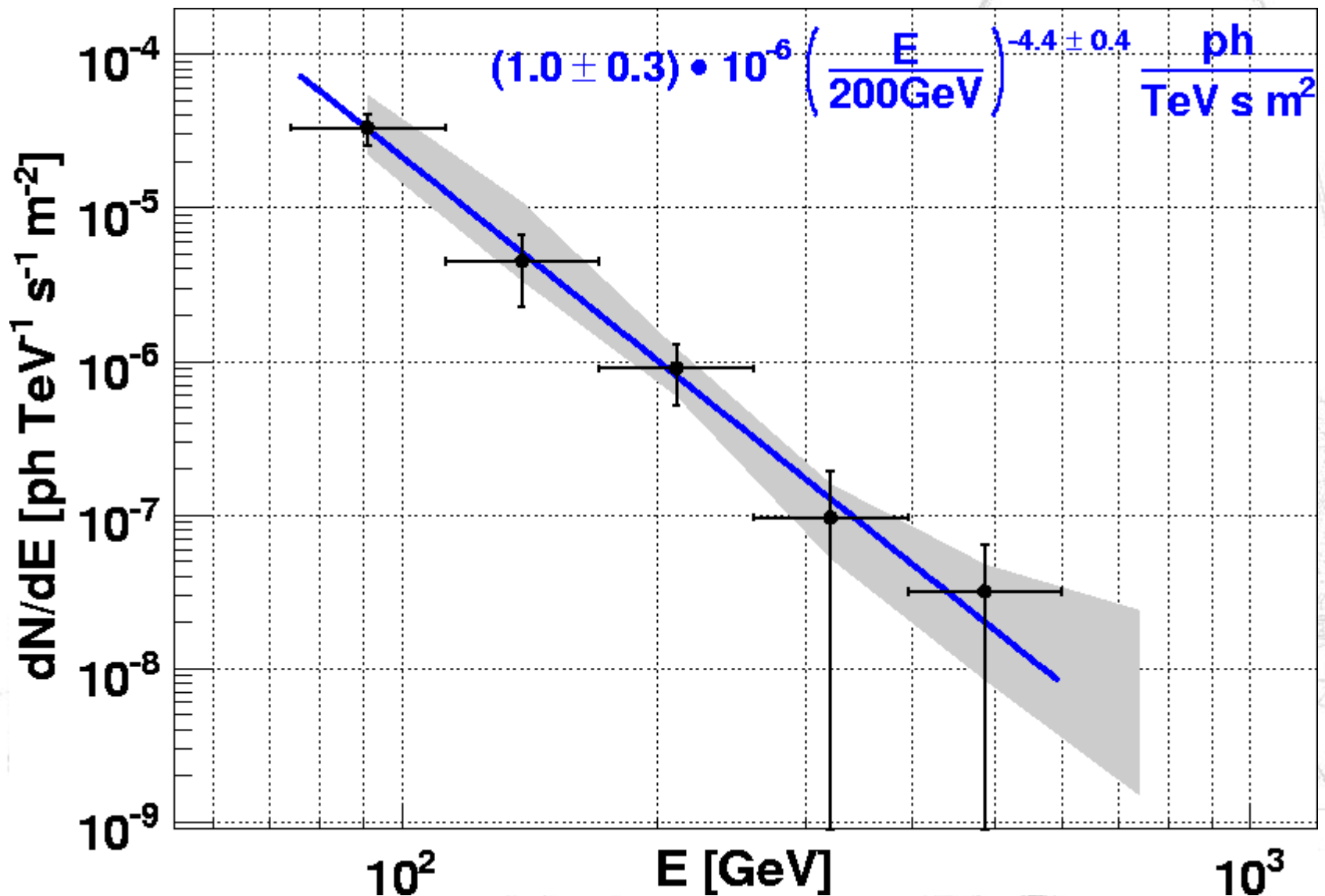
ThetaSquare Distribution: without correction



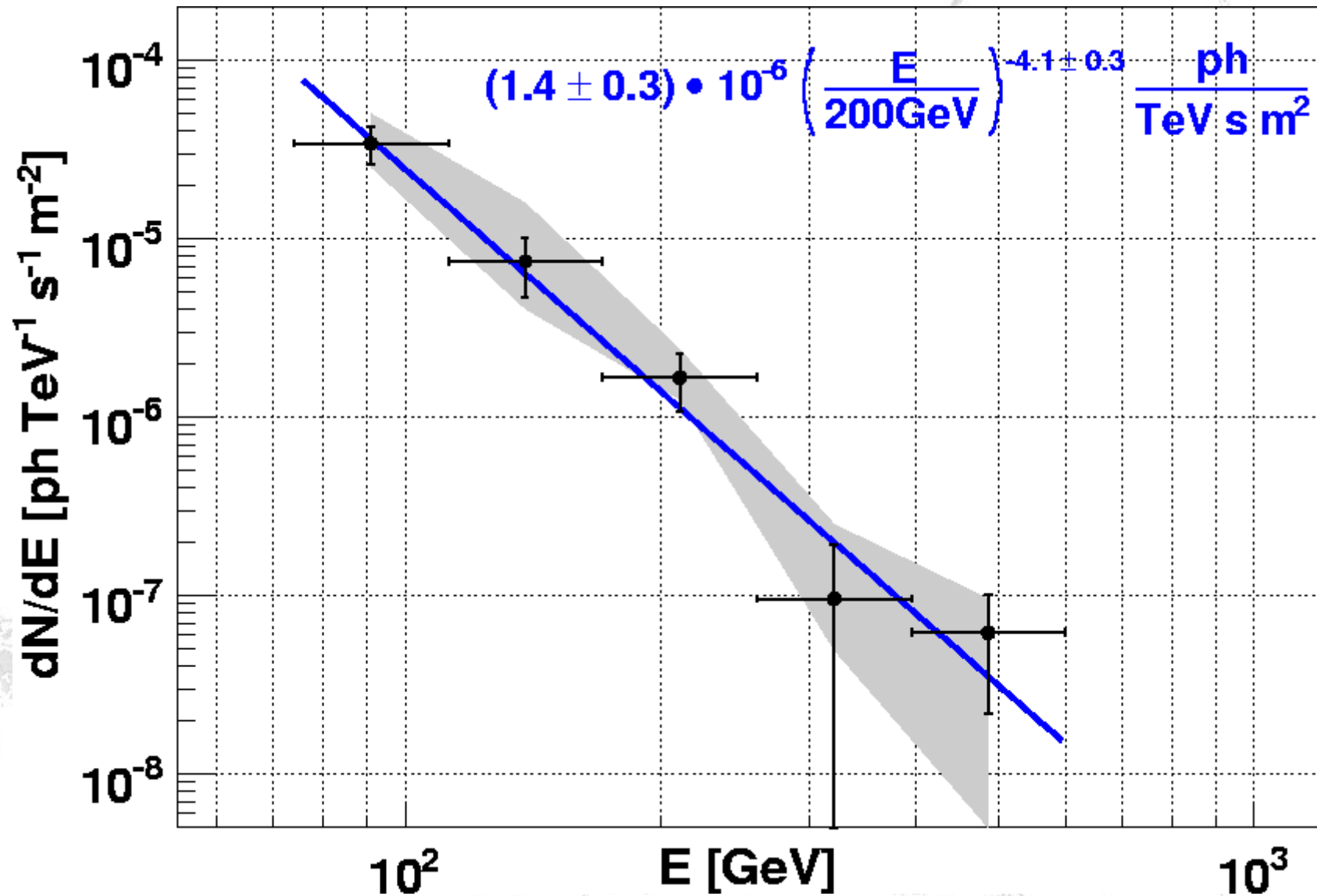
ThetaSquare Distribution: with correction



Spectrum: without correction



Spectrum: with correction



Conclusions

- SAL is below the shower
=> correction can be applied
- data suffering from SAL can be corrected
- good results from the data of the MWL campaign of PG 1553+113 could be obtained
=> publication